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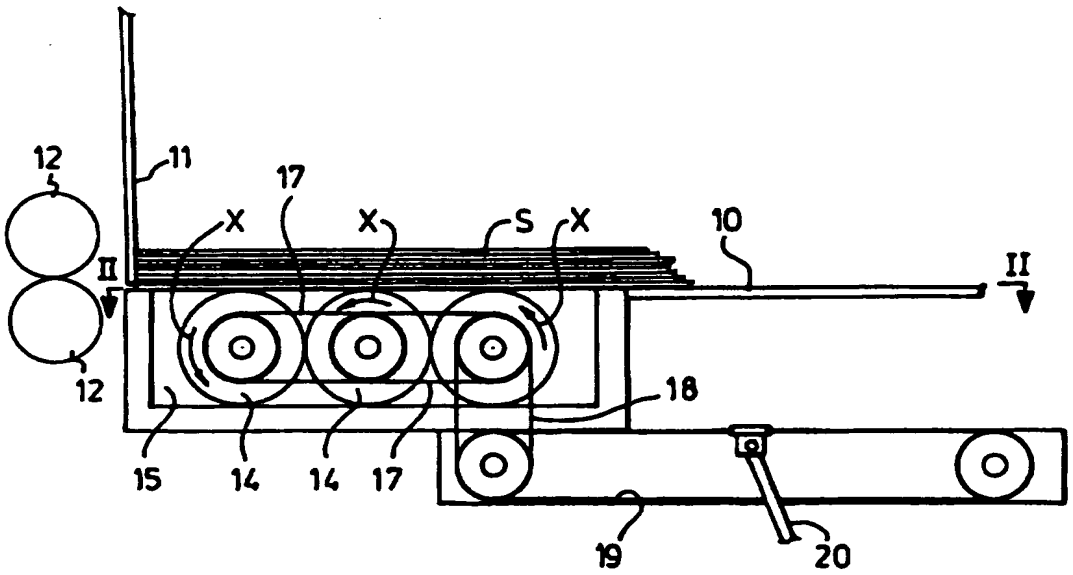
(54) Title: APPARATUS FOR FEEDING SHEET MATERIAL



(57) Abstract

There is disclosed apparatus for feeding sheet material comprising a feed table (10) having a gate (11) and upon which the sheets (5) may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed (13) or rollers (14) within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate into the nip of take-up rolls (12) and means to allow the rollers to free-wheel once the low rmost sheet is being advanced by said take-up rolls.

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APPARATUS FOR FEEDING SHEET MATERIAL

This invention concerns apparatus for feeding sheet material, particularly, though by no means exclusively, of corrugated board or card as used in the box and carton making industries.

In general, stacked sheets are placed on a feed table against a gate which allows only the lowermost sheet to pass therebeneath under the action of a reciprocating vacuum suction cup, feed rollers or a kicker mechanism, to be taken into the nip of take-up rolls. Such feeding arrangements must be controlled with great precision and even then misfeeds are a not uncommon experience.

One solution to these problems is proposed in my co-pending British Patent Application No. 9326089.1, but this involves reciprocating movement of the entire roller bed, which is not energy efficient and places certain restrictions on sheet size.

According to the present invention there is provided apparatus for feeding sheet material comprising a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate into the nip of take-up rolls and means to allow the rollers to free-wheel once the lowermost sheet is being advanced by said take-up rolls.

The rollers may be fitted with sprag clutches and may advance the sheet being fed at a slower speed than that of the take-up rolls.

Vacuum suction may be applied from beneath the rollers to pull the lowermost sheet downwardly thereagainst.

The rollers may be spaced such that the lowermost sheet can drape to give substantial area contact between the sheet and the rollers.

The invention will be further apparent from the following description, with reference to the figures of the accompanying drawing, which show, by way of example only, one form of sheet feeding apparatus embodying same.

Of the drawing :-

Figure 1 shows a side elevation of the apparatus; and

Figure 2 shows a cross-section through the apparatus on the line II-II of Figure 1.

Referring now to the drawing, it will be seen that the apparatus comprises a feed table 10 upon which a stack of sheets S may be placed against a gate 11 beneath which only the lowermost sheet in the stack may pass.

Successive sheets are advanced beneath the gate 11 into the nip of take-up rolls 12 by a bed 13 of rollers 14 within the surface of the table.

The rollers are mounted within a chamber 15 to which vacuum suction is applied to pull the lowermost sheet downwardly thereagainst. The spacing between the rollers 14 allows the sheet to drape between them to enhance the area of contact.

The rollers advance the lowermost sheet by being rotatably driven as indicated by the arrows X at a speed less than the speed of the take-up rolls 12. Once the sheet is advanced by the rolls 12 the rollers 14 free-wheel, the rollers 14 having sprag clutches between their inner peripheries and their drive shafts 16.

In this example, the rollers 14 are rotatably interconnected by drive belts 17 and one roller 14 is driven by a belt 18 itself driven from a toothed belt 19 reciprocated by an arm 20 operating in time with line speed (typically that previously used for a kicker mechanism, facilitating easy retro-fitting). On the reverse stroke of the arm 20 the rollers 14 are not driven in reverse direction since they are then in their free-wheeling mode.

It will be appreciated that it is not intended to limit the invention to the above example only, many variations, such as might readily occur to one skilled in the art, being possible, without departing from the scope thereof as defined by the appended claims.

Thus, for example, the rollers 14 may be driven intermittently or continuously by an electric motor, though this is not preferred since, in the case of a continuous drive, there will be some slippage between the rearward rollers and the next sheet to be fed until the previous sheet has cleared the gate 11.

CLAIMS

1. Apparatus for feeding sheet material comprising a feed table having a gate and upon which the sheets may be stacked against the gate which allows only the lowermost sheet to pass therebeneath, a bed of rollers within the surface of the table which may be rotatably driven to advance the lowermost sheet beneath the gate into the nip of take-up rolls and means to allow the rollers to free-wheel once the lowermost sheet is being advanced by said take-up rolls.

2. Apparatus according to claim 1 wherein the rollers are fitted with sprag clutches and advance the sheet being fed at a slower speed than that of the take-up rolls.

3. Apparatus according to claim 1 or claim 2 wherein vacuum suction is applied from beneath the rollers to pull the lowermost sheet downwardly thereagainst.

4. Apparatus according to any one of claims 1 to 3 wherein the rollers are spaced such that the lowermost sheet can drape to give substantial area contact between the sheet and the rollers.

5. Apparatus according to any preceding claim wherein the rollers are rotably interconnected by drive belts and one is driven by a further drive belt reciprocated by an arm operating in time with line speed.

6. Apparatus according to claim 5 wherein said further drive belt is toothed.

7. Apparatus according to any one of claims 1 to 4 wherein the rollers are driven by an electric motor.

8. Apparatus according to claim 7 wherein the rollers are driven intermittently.

9. Apparatus according to claim 7 wherein the rollers are driven continuously.

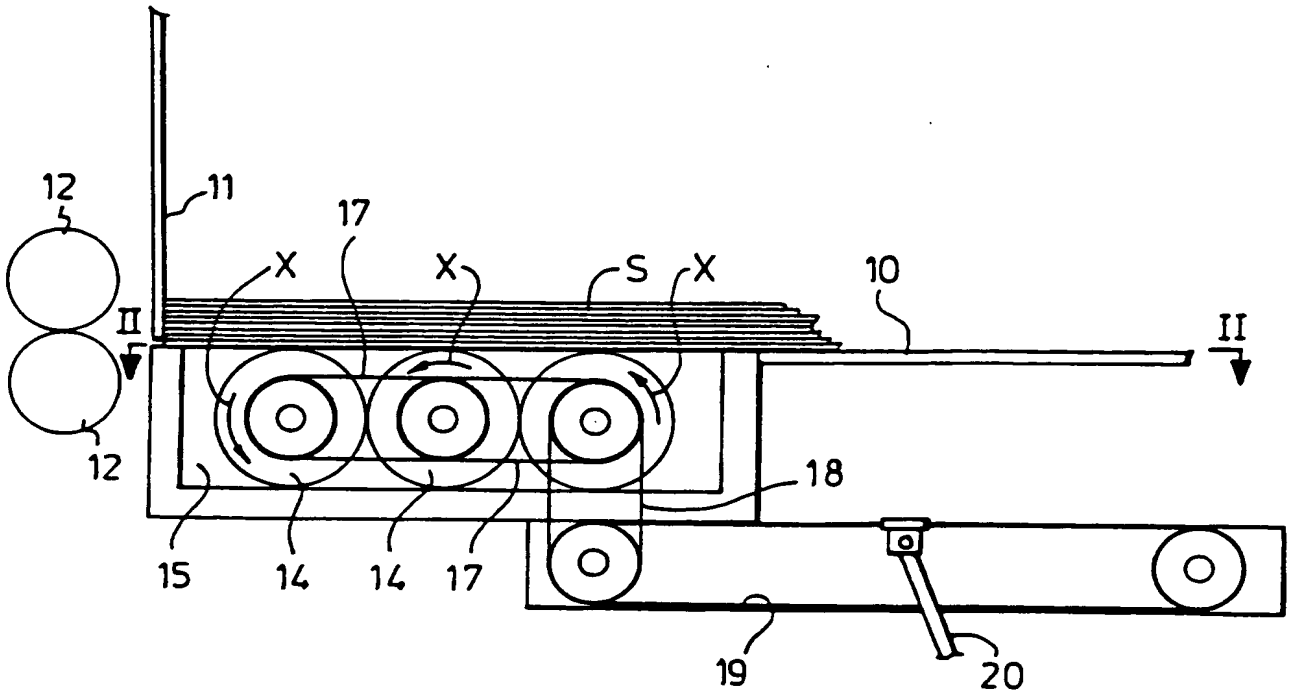

FIG.1

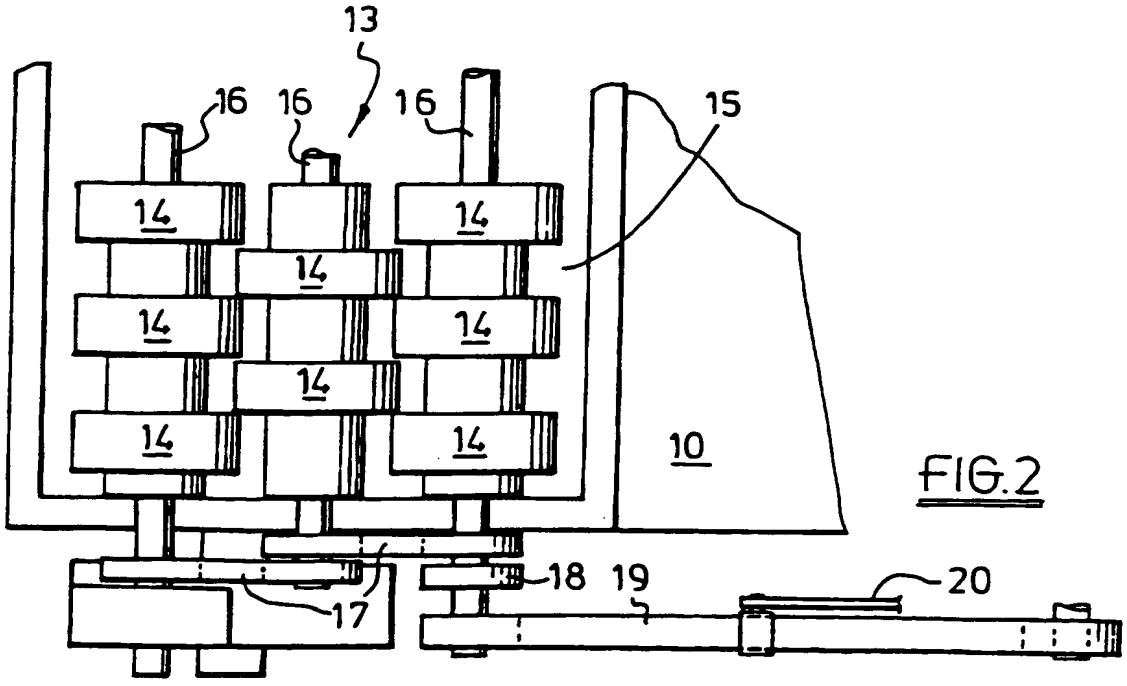

FIG.2

INTERNATIONAL SEARCH REPORT

Interna[redacted]pplication No PCT/GB 95/02097

A. CLASSIFICATION OF SUBJECT MATTER

B 65 H 3/06,B 65 H 3/08,B 65 H 3/02

According to International Patent Classification (IPC) or to both national classification and IPC 6

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B 65 H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP, A, 0 414 157 (SAWADA) 27 February 1991 (27.02.91), abstract; column 5, lines 8-15; fig. 1. --	1-4,7
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A	US, A, 5 184 811 (SARDELLA) 09 February 1993 (09.02.93),	1-9

[X] Further documents are listed in the continuation of box C. [ ] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
07 December 1995	17. 01. 96

Name and mailing address of the ISA	Authorized officer
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Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	fig. 1. --	
A	EP, A, 0 183 361 (PRIME TECHN.) 04 June 1986 (04.06.86), abstract; fig. 1. ----	1-9

ANHANG

zum internationalen Recherchenbericht über die internationale Patentanmeldung Nr.

ANNEX

to the International Search Report to the International Patent Application No.

ANNEXE

au rapport de recherche international relatif à la demande de brevet international n°

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In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentdokumente angegeben. Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

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